IN THE CLAIMS

Please replace the claims in the present application with the following listing of claims:

1. (currently amended) A frequency domain interpolative CODEC system for low bit rate coding of speech, comprising:

a linear prediction (LP) front end adapted to process an input signal providing LP parameters which are quantized and encoded over predetermined intervals and used to compute a LP residual signal;

an open loop pitch estimator adapted to process said LP residual signal, a pitch quantizer, and a pitch interpolator and provide a pitch contour within the predetermined intervals; and

a signal processor responsive to said LP residual signal and the pitch contour and adapted to perform the following steps:

~~provide a voicing measure, said voicing measure characterizing a degree of voicing of said input speech signal and is derived from several input parameters that are correlated to degrees of periodicity of the signal over the predetermined intervals;~~

extract a prototype waveform (PW) from the LP residual and the open loop pitch contour for a number of equal sub-intervals within the predetermined intervals;

normalize the PW by said PW's gain; ~~and~~

represent a variable dimension PW in a magnitude domain without further decomposition of said PW into complex components in a mean plus deviations form in multiple bands;

compute a voicing measure, said voicing measure characterizing a degree of voicing of said input speech signal and is derived from several input parameters that are correlated to degrees of periodicity of the signal over the predetermined intervals;

provide for a voicing classification for the predetermined intervals based on the computed voicing measure; and

~~directly~~ quantize the PW multi-band mean plus deviations for all speech frames in a magnitude domain using ~~without further decomposition of said PW into complex components, said direct quantization being performed by~~ a hierarchical quantization

method that employs fixed dimension vector quantizers (VQ) with parameters based on [[a]] the voicing classification ~~using fixed dimension vector quantizers (VQ's)~~.

2-4. (canceled).

5. (currently amended) A system as recited in claim 1 ~~further comprising~~ wherein the representation of the variable dimension PW is in fixed but unequal bands at each sub-interval, and the means are computed as a spectrally weighted average of the PW magnitude in each band and at each sub-interval.

~~a hierarchical mean-deviation vector quantization of a variable dimension PW magnitude vector is performed using fixed dimension VQs.~~

6. (currently amended) A system as recited in claim 5, wherein ~~a seven~~ in the quantization step a fixed dimensional PW mean vector is derived ~~as a seven band subband average of the PW magnitude vector~~ using all the PW means as its elements at each sub-interval.

7. (canceled).

8. (currently amended) A system as recited in ~~claim 7~~ claim 6, wherein ~~said hierarchial mean deviation vector quantization comprises switched backward prediction of the variable dimension PW magnitude vector using fixed dimension VQs.~~ for frames classified as voiced the quantization step comprises:

a backward predictive vector quantization of the fixed dimensional PW means vector for a last sub-interval;

reconstruction of the quantized PW means vector for the last sub-interval by inverse backward vector quantization; and

reconstruction of the quantized PW means vector for intermediate sub-intervals by linear interpolation.

9-11. (canceled).

12. (new) A systems as recited in claim 6 wherein for frames classified as unvoiced the quantization step comprises:

a backward predictive vector quantization of the fixed dimensional PW means vector for a middle sub-interval;

a backward predictive vector quantization of the fixed dimensional PW means vector for a last sub-interval;

reconstruction of the quantized PW means vector for the middle sub-interval by inverse backward predictive vector quantization;

reconstruction of the quantized PW means vector for the last sub-interval by inverse backward predictive vector quantization; and

reconstruction of the quantized PW means vector for intermediate sub-intervals by linear interpolation.

13. (new) A system as recited in claim 6 wherein the quantization step comprises:

derivation of a variable dimensional PW deviations vector as a difference between the PW magnitude spectra and a reconstructed quantized means in each band and for each sub-interval;

selection of a fixed number of perceptually significant harmonics at each of a plurality of selected time instants by a procedure that emphasizes low frequencies while precluding frequencies below 200 Hz at each said selected time instant; and

conversion of the variable dimensional PW deviations vector to a fixed dimensional PW deviations vector comprising elements that are PW deviations at the selected harmonics.

14. (new) A system as recited in claim 13 further comprising of the following steps for frames classified as voiced:

backward predictive multi-stage vector quantization of the fixed dimensional PW deviations vector for a middle sub-interval;

backward predictive multi-stage vector quantization of the fixed dimensional PW deviations vector for a last sub-interval;

reconstruction of the fixed dimensional quantized PW deviations vector for the middle sub-interval by inverse backward predictive vector quantization;

reconstruction of the fixed dimensional quantized PW deviations vector for the last sub-interval by inverse backward predictive vector quantization;

reconstruction of the variable dimensional quantized PW vector for the middle and last sub-intervals as a sum of the reconstructed quantized PW mean at each harmonic frequency plus a harmonic deviation if the harmonic frequency is one of the selected harmonics; and

reconstruction of the variable dimensional quantized PW vector for intermediate sub-intervals by linear interpolation.

15. (new) A system as recited in claim 13 further comprising of the following steps for frames classified as unvoiced:

vector quantization of the fixed dimensional PW deviations vector for a middle sub-interval;

vector quantization of the fixed dimensional PW deviations vector for a last sub-interval;

reconstruction of the fixed dimensional quantized PW deviations vector for the middle sub-interval by inverse vector quantization;

reconstruction of the fixed dimensional quantized PW deviations vector for the last sub-frame by inverse vector quantization;

reconstruction of the variable dimensional quantized PW vector for the middle and last sub-intervals as a sum of the reconstructed quantized PW mean at each harmonic frequency plus a harmonic deviation if the harmonic frequency is one of the selected harmonics; and

reconstruction of the variable dimensional quantized PW vector for intermediate sub-intervals by linear interpolation.